ONTARIO MINISTRY OF ENVIRONMENT
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OPERATING SUMMARY

PRESTON

1972

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MINISTRY OF THE
ENVIRONMENT

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Preston : water pollution control plant.

81791

Ontario

Ministry of the
Environment

135 St. Clair Avenue West
Toronto 195, Ontario

We are pleased to present you with the 1972 operating summary for the water pollution control plant serving your community.

This summary contains data on the performance of the plant as well as relevant financial information. Of particular interest is the review of the year's activities in which significant items of these data are discussed in some detail by the operations engineer and his staff who, by their day-to-day involvement with the operation, are thoroughly familiar with the plant.

We appreciate your continuing interest in protecting the environment through the efficient operation of this wastewater treatment facility.

D.S. Caverly,
Assistant Deputy Minister.

D.A. McTavish, P. Eng.,
Director,
Project Operations Branch.

MINISTRY OF THE ENVIRONMENT

MINISTER
Honourable James A. C. Auld

DEPUTY MINISTER
E. Biggs

ASSISTANT DEPUTY MINISTER
D. S. Caverly

EXECUTIVE DIRECTOR
K. H. Sharpe

PROJECT OPERATIONS BRANCH

DIRECTOR
D. A. McTavish

ASSISTANT DIRECTOR
C. W. Perry

ACTING REGIONAL SUPERVISOR
B. W. Hansler

OPERATIONS ENGINEER
J. Nurmberg

135 St. Clair Avenue West
Toronto 195

PRESTON

WATER POLLUTION CONTROL PLANT

operated for

THE TOWN OF PRESTON

by the

MINISTRY OF THE ENVIRONMENT

1972 ANNUAL OPERATING SUMMARY

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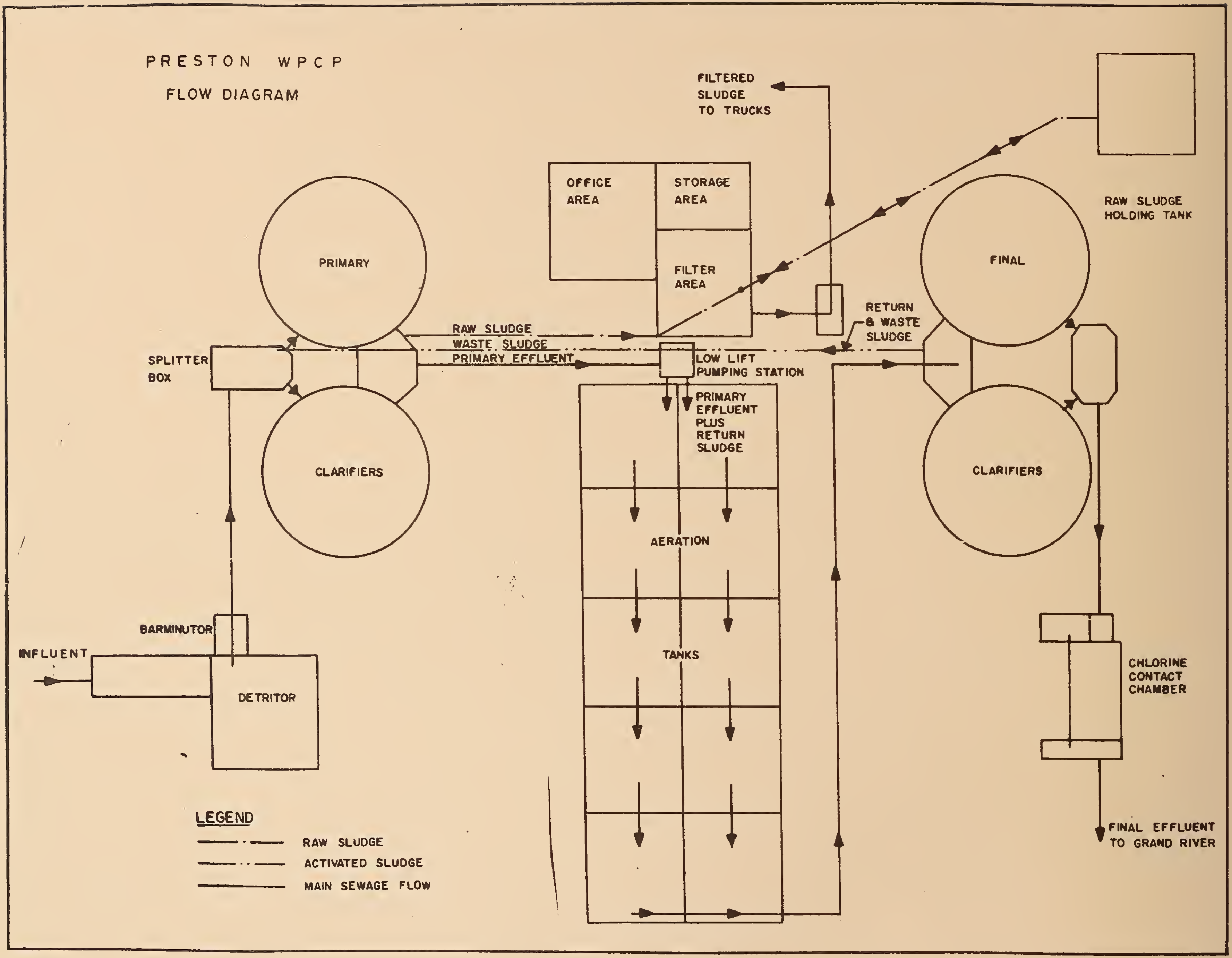

PRESTON WPCP
FLOW DIAGRAM
FILTERED SLUDGE TO TRUCKS
OFFICE AREA
STORAGE AREA
FILTER AREA
RAW SLUDGE HOLDING TANK
PRIMARY
CLARIFIERS
FINAL
CLARIFIERS
SPLITTER BOX
RAW SLUDGE
WASTE SLUDGE
PRIMARY EFFLUENT
RETURN & WASTE SLUDGE
LOW LIFT PUMPING STATION
PRIMARY EFFLUENT PLUS RETURN SLUDGE
AERATION
TANKS
BARMINUTOR
INFLUENT
DETRITOR
CHLORINE CONTACT CHAMBER
FINAL EFFLUENT TO GRAND RIVER
LEGEND
RAW SLUDGE
ACTIVATED SLUDGE
MAIN SEWAGE FLOW

DESIGN DATA

PROJECT NO.		2-0046-59
TREATMENT		Activated Sludge
DESIGN FLOW		1.8 mgd
DESIGN POPULATION		15,000
BOD	- Raw Sewage	300 mg/l
	- Removal	95%
SS	- Raw Sewage	350 mg/l
	- Removal	90%

PRIMARY TREATMENT

Grit Removal

Type: Dorr detritor
Size: One 20' x 20' x 1½' (3,740 gal)
Retention: 2.1 min

Comminution

Type: Barminutor
Size: Model C (36")

Primary Sedimentation

Type: Dorr
Size: Two 50' dia x 10' swd
(246,000 gal)
Retention: 3.3 hr
Loading: Surface, 460 gal/ft^2/day
Weir, 5730 gal/ft/day

Sewage Lift Pumps

Type: Worthington
Size: Two 1800 gpm @ 17.4' tdh

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical; single-pass
Size: Two 150' x 30' x 13'
(731,000 gal)
Retention: 9.8 hr

Aerators

- Ten Ames-Crosta

Secondary Sedimentation

Type: Dorr
Size: Two 50' dia x 10' swd
(246,000 gal)
Retention: 3.3 hr
Loading: Surface, 460 gal/ft^2/day
Weir, 5730 gal/ft/day

CHLORINATION

Type: F & P
Size: One 400 lb/day

Chlorine Contact Chamber

Size: One 30' x 15' x 6' 8"
(18,700 gal)
Retention: 15 min

OUTFALL

- to Grand River

SLUDGE HANDLING

Holding Tank

Size: One 20' x 20' x 11'
(4,400 cu ft or 27,400 gal)

Vacuum Filter

Type: Komline-Sanderson
Size: One 250 sq ft

'72 Review

GENERAL

The average daily flow for the year of 1.44 million gallons is an increase of 0.12 million gallons from the 1971 average daily flows. In 1972 the plant treated a total of 527.8 million gallons of sewage at a total cost of $88,067.86. The operating cost per million gallons was $166.90 and the cost per pound of BOD removed was 3.5 cents, while the cost of suspended solids removed was 2.4 cents.

Throughout 1972 the plant still experienced some operational problems due to the incoming waste of either starch, grease, potato slices and/or heavy metals, especially copper, nickel and zinc. On various occasions, the quantity of foam throughout the plant was very excessive.

PLANT FLOWS AND CHLORINATION

The average daily flow of 1.44 million gallons was an increase of approximately nine percent from 1971. The daily design flow of 1.8 million gallons was exceeded approximately 15 percent of the time. Although the flow increased the amount of grit removed decreased to the decrease in the amount of solids in the raw sewage.

The average dosage rate required to produce an average chlorine residual of 0.5 mg/l was 7.0 mg/l.

PLANT EFFICIENCY

The raw sewage BOD averaged 536 mg/l with the design raw sewage BOD concentrations of 300 mg/l being exceeded 85 percent of the time, similar to 1971 values. The average raw sewage BOD content of 536 mg/l is approximately 180 percent of the design value, a decrease of 40 percent from 1971.

The raw sewage suspended solids averaged 709 mg/l with the design raw sewage suspended solids of 350 mg/l being exceeded 85 percent of the time which is slightly less than the situations in 1969 to 1971. The average suspended solids concentration of 709 mg/l is approximately 200 percent of design value which is a decrease of approximately 25 percent from 1971.

The average BOD and suspended solids in the final effluent were 30 mg/l and 22 mg/l respectively. Reductions of 94 and 97 percent were experienced in both the BOD and suspended solids removal. Although the BOD and suspended solids reductions achieved was extremely good, the effluent still exceeded the Ministry of the Environment's objectives 80 percent of the time for BOD and 70 percent of the time for suspended solids, an increase of 5 and 20 percent respectively from 1971. The decrease in final effluent quality is a result of the abnormally high organic strength and toxic industrial waste in the raw sewage.

SLUDGE DISPOSAL

The high organic loading on the plant was reflected in the amount of sludge requiring disposal. A total of 6363 cubic yards of liquid sludge, approximately 2,000 cubic yards less than in 1971 and 6210 cubic yards of sludge dewatered by vacuum filtration, approximately the same as in 1971 were hauled from the plant during 1972.

VACUUM FILTRATION

The average total raw sludge content was 7.8 percent while the average filtered solids content was 23.8 percent. The average dosage of lime was 12.7 percent and the average dosage of ferric chloride was 3.6 percent.

CONCLUSIONS AND RECOMMENDATIONS

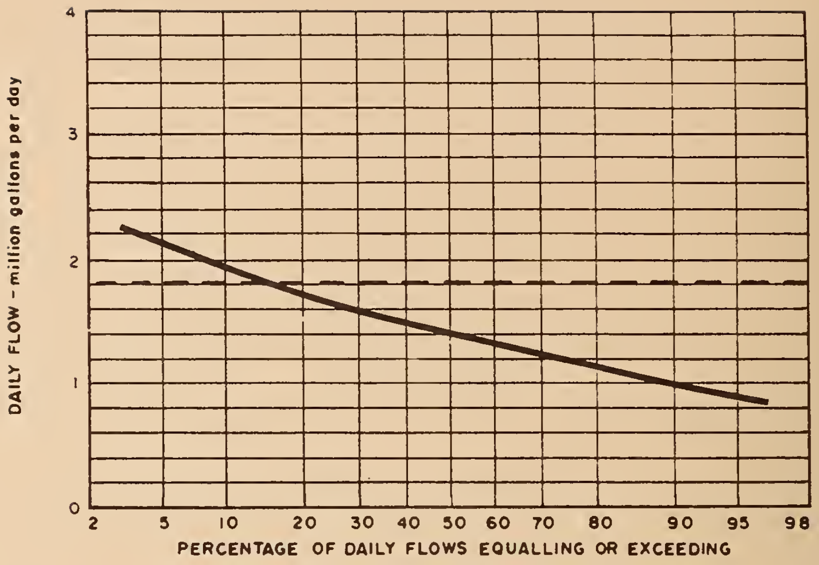
Despite the very high organic loading, substantially due to an industry in the Town, the plant maintained a very high degree of efficiency during the year indicating excellent control of the plant process.

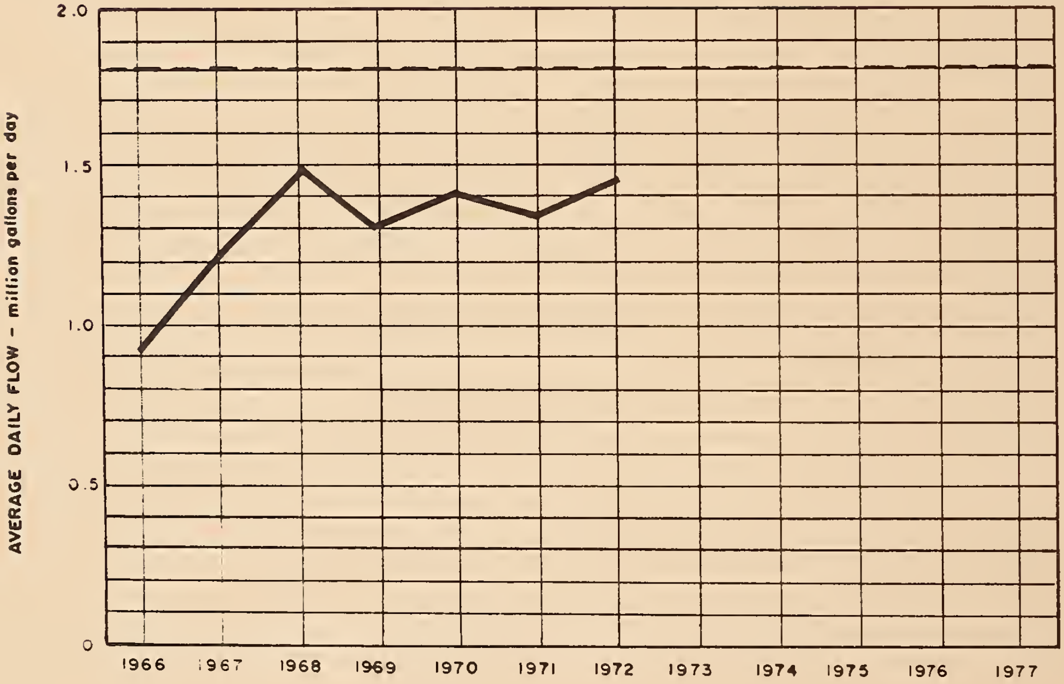
It is recommended that the Town of Preston keep a close surveillance on the industrial wastes discharged from its various industries to ensure that the organic discharge and toxic heavy metal discharges are not greater than specified in the Town's bylaws and agreements.

The construction of the plant expansion is anticipated to be finished by the fall of 1973.

PROCESS DATA

FLOWS



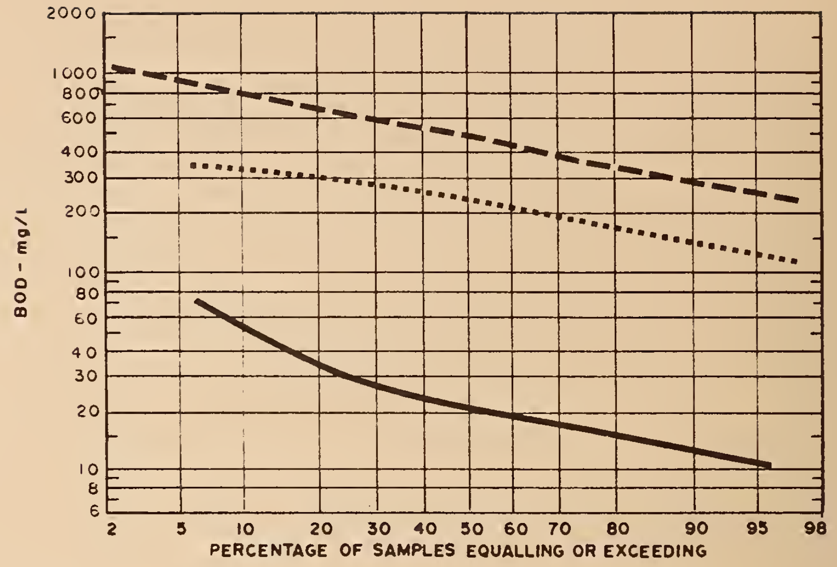


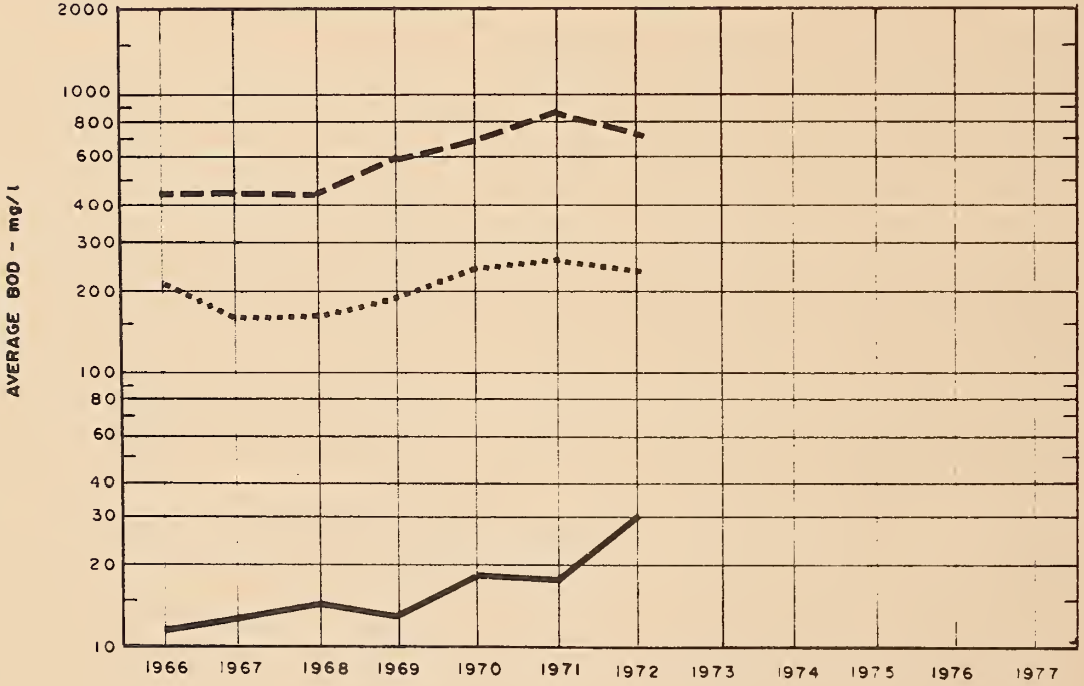
DESIGN CAPACITY - - - - - - - -

PLANT PERFORMANCE

MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW million gallons	AVERAGE DAY mil. gal	MAXIMUM DAY mgd	INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l P	EFFLUENT mg/l P
						%	10^3 pounds			%	10^3 pounds		
JAN	40.6	1.31	1.77	766	40	95	295	1050	31	97	414	16	8.1
FEB	37.9	1.31	1.52	408	21	95	147	605	18	97	222	13	2.9
MAR	51.9	1.67	2.23	562	17	97	283	830	14	98	406	12	7.0
APR	52.6	1.75	2.46	491	22	96	247	642	24	96	325	10	2.9
MAY	43.1	1.40	1.97	530	45	92	209	579	49	92	228	18	5.1
JUNE	39.8	1.33	1.65	506	19	96	194	617	15	98	240	13	6.8
JULY	38.3	1.24	1.62	526	30	94	190	525	15	97	195	13	9.2
AUG	40.6	1.31	1.58	650	28	96	253	659	14	98	262	12	6.2
SEPT	37.1	1.24	1.51	540	13	98	196	788	13	98	288	12	4.1
OCT	38.1	1.23	1.54	544	16	97	201	864	14	98	324	11	6.0
NOV	44.3	1.48	1.60	577	58	98	230	750	25	97	321	16	5.9
DEC	63.5	2.05	2.67		40			731	20	97	451		3.0
TOTAL	527.8	-	-	-	-	-		-	-	-	3676	-	-
AVG.		1.44	MAXIMUM 2.67	536	30	94	222	709	22	97	306	13	5.7
No. of Samples	-	-	-	97	85	-	-	212	188	-	-	23	23

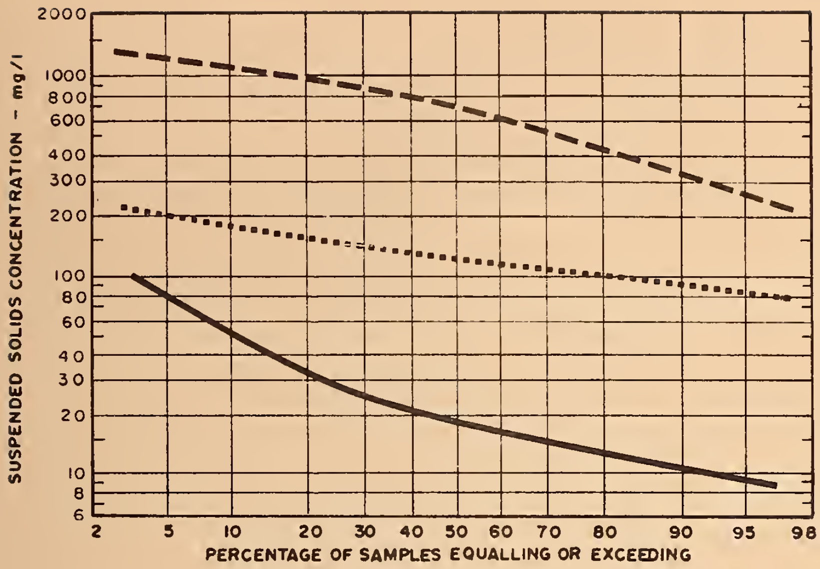
BIOCHEMICAL OXYGEN DEMAND

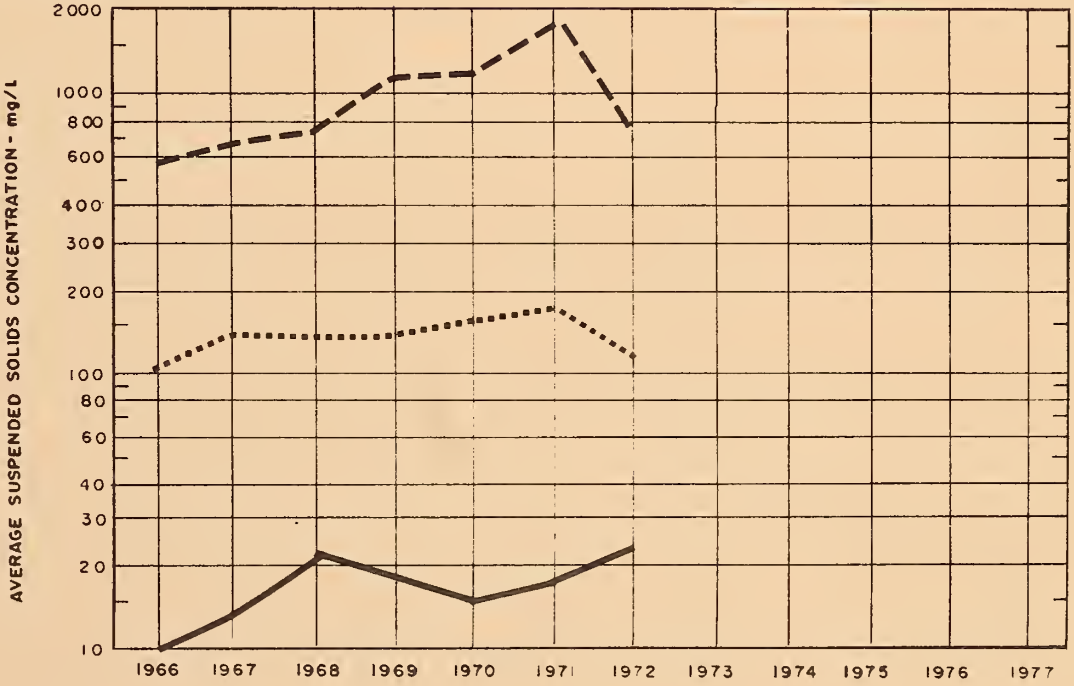




PLANT INFLUENT — — — — —
PRIMARY EFFLUENT ················
PLANT EFFLUENT ————

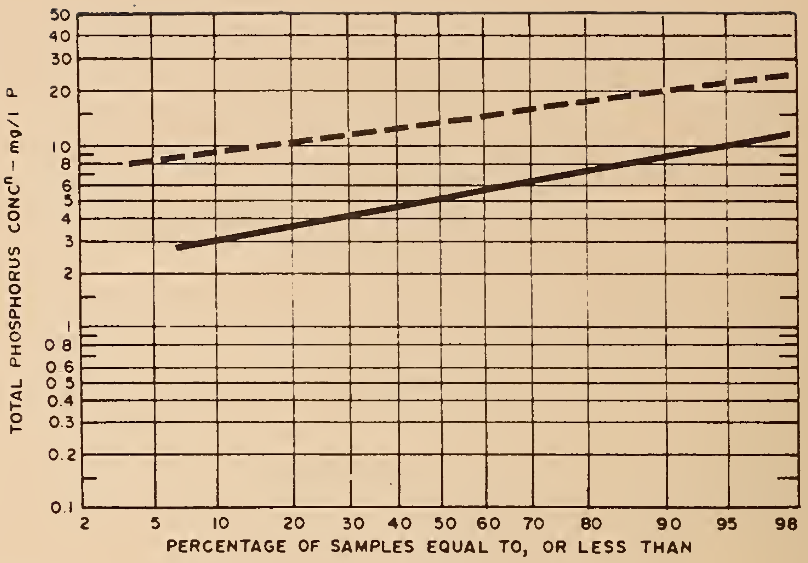
SUSPENDED SOLIDS

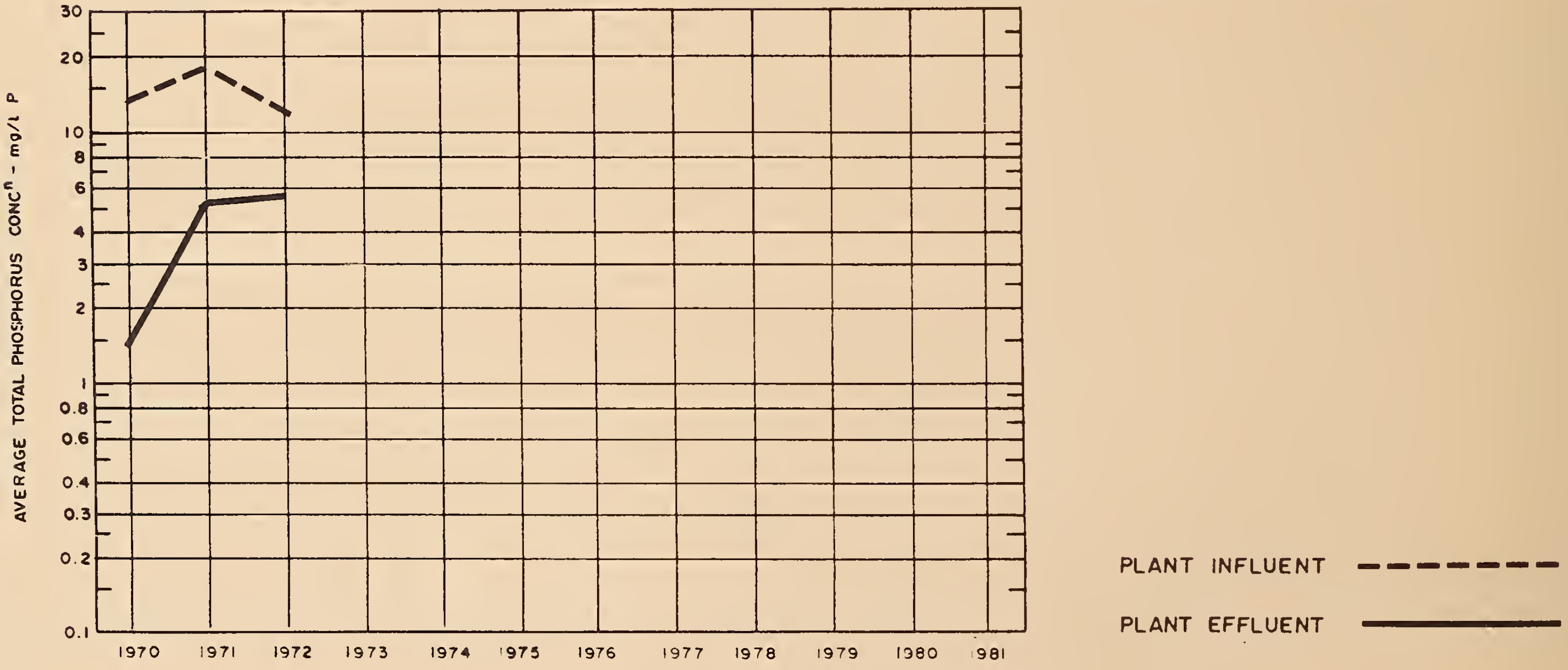




PLANT INFLUENT	— — — — —
PRIMARY EFFLUENT	················
PLANT EFFLUENT	――――――

PHOSPHORUS


TOTAL PHOSPHORUS CONC^n - mg/l P
50
40
30
20
10
8
6
5
4
3
2
1
0.8
0.6
0.5
0.4
0.3
0.2
0.1
2
5
10
20
30
40
50
60
70
80
90
95
98
PERCENTAGE OF SAMPLES EQUAL TO, OR LESS THAN


AVERAGE TOTAL PHOSPHORUS CONC^n - mg/l P
30
20
10
8
6
4
3
2
1
0.8
0.6
0.4
0.3
0.2
0.1
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
PLANT INFLUENT
PLANT EFFLUENT

TREATMENT DATA

MONTH	GRIT	CHLORINATION		PRIMARY EFFLUENT		AERATION		VACUUM FILTER OPERATION							SLUDGE	
								RAW SLUDGE			CaO	$FeCl_3$	YIELD	FILTER	DEWATERED	LIQUID
	QUANTITY REMOVED cubic feet	Cl_2 USED 10^3 pounds	AVG. DOSE mg/l	BOD mg/l	SUSPENDED SOLIDS mg/l	MLSS CONC mg/l	F/M day^{-1}	AMT. 10^5 gallons	TOTAL SOLIDS percent	FILTERED 10^3 pounds	USED 10^3 pounds	USED 10^3 pounds	lb/ft^2/hr	CAKE T. S. percent	Cu. Yd.	Cu. Yd.
JAN	63	2.6	6.9	227	125	1490	.28	3.6	8.7	223	28	8.7	8.3	25.1	590	652
FEB	21	2.7	7.0	205	117	1650	.23	2.4	8.9	211	24	6.9	8.5	25.0	560	60
MAR	38	2.9	5.5	238	116	1510	.37	3.1	9.5	246	27	9.4	8.7	26.5	640	232
APR	34	2.9	5.6	201	110	1732	.29	3.2	8.3	188	25	8.4	7.7	23.4	500	589
MAY	71	3.2	7.5	218	109	1660	.26	3.4	6.7	211	25	7.7	7.8	23.3	550	261
JUNE	46	3.0	7.5	259	97	1660	.29	3.5	6.4	200	27	8.6	7.9	21.2	540	246
JULY	68	3.1	8.1	324	109	1830	.31	4.3	6.0	219	27	8.7	8.9	22.3	550	459
AUG	91	3.0	7.4	310	106	1510	.38	4.6	6.7	215	27	6.3	9.2	23.7	540	705
SEPT	51	3.1	8.2	204	118	1390	.26	3.5	6.6	166	22	6.0	8.8	22.3	440	653
OCT	49	3.0	8.0	238	139	2180	.19	3.1	7.2	116	15	4.0	8.4	21.3	290	798
NOV	56	3.0	6.8	308	177	3351	.19	3.5	8.9	211	27	5.3	8.9	22.2	500	734
DEC	52	3.3	5.1	200	166	1900	.30	6.0	9.7	220	25	6.2	9.5	29.1	510	974
TOTAL	640	35.8	–	–	–	–	–	42.2		2426	299	86.2			6210	6363
AVG.	1.2 cu.ft/mil gal	3.0	7.0	240	124	1822	.28	3.5	7.8	202	DOSE 13 %	DOSE 3.6 %	8.6	23.8	518	530

VACUUM FILTRATION